



23 TECHNIQUES

TO SCORE MORE IN QUANTITATIVE APTITUDE OF BANK, SSC & OTHER GOVT EXAMS

PREFACE

Speed and Accuracy are the two key ingredients needed for one to succeed in Bank Exams or for that matter, any competitive exam which tests Quantitative Aptitude. It is an open secret that given unlimited time, most of the quantitative aptitude questions of any competitive exam can be solved based on the knowledge we have gained during our school days. But, the only thing we don't have in such exams is time.

In light of this, the challenge is to learn new techniques which will help us solve questions with very high speed without missing out on the accuracy. Having trained lakhs of students for Bank and SSC exams through our online programs, we have understood the need for helping the aspirants with such techniques.

This book consists of Twenty Three (23) such techniques one must know if one is serious about clearing bank and SSC exams. These 23 techniques have been carefully selected as most important out of 120 such techniques, all of which are covered through TalentSprint's online programs for Bank and SSC Exams Preparation. The techniques discussed in this book will help you solve some challenging questions in about 3-10 seconds, which would otherwise take about 30-45 seconds to arrive at the answer.

Along with this ebook, you also get access to the videos covering these techniques in detail. You can access all these videos through the login credentials that you get along with the purchase of this ebook on the following link:
http://banking.talentsprint.com/courses/FreeTrial/LS/122/courseware/e45251720bb44142a25f83dd85d413f4/14708ae197204f0cba3bf3984caca833/

Trust you will benefit from these simple but effective techniques and succeed in getting your dream job.

Best Wishes
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TECHNIQUE # 1: COMPOUND INTEREST THROUGH EFFECTIVE PERCENTAGE

Challenge: What will be the compound interest on 5000 for 2 years at 12% per annum?
1) 1250 2) 1200 3) 1272 4) 2174 5) None of these

Regular Method	Smart Method
CI = P * (1+R/100)^T - P CI = 5000*(1+12/100)^2-5000 = 5000 * (112/100)*(112/100)-5000 = 5000 *112 *112/10000-5000 = 5*1254.4 - 5000 (6-15 sec) = 6272 - 5000 = 1272	CI = (a+b+ab/100)% of P, where a and b are interest rate percentages for 2 years. CI = (12+12+12*12/100) * 5000 = 24+144/100 * 5000 = 25.44 * 5000 = 1272

Use this smart method to solve more such questions:

Question 1: What will be the compound interest on 5000 for 2 years at 7% per annum?
1) 725 2) 700 **3) 724.50** 4) 714.50 5) None of these

Question 2: The compound interest on a certain amount for 2 years at the rate of 5% is 102.5. Find the amount.
1) 500 2) 725 3) 850 **4) 1000** 5) None of these

TECHNIQUE # 2: PERCENTAGE COMPARISON BETWEEN TWO VALUES

Challenge: If A's salary is 25% more than B's salary, then by what per cent is B's salary less than A's salary?

1) 25% 2)20% 3)16.66% 4) Cannot be determined 5) None of these

Regular Method	Smart Method
A = B + 25% of B => A = B + B/4 = 5B/4 => B = 4A/5 = 80% of A => B is only 80% of A. Therefore, B is 20% less than A	Consider the fraction 1/4 (=25%, given in the question) To find how much % is B **less** than A, just **increase** the **denominator** of the fraction by 1 (= value in the numerator) => 1/4 becomes 1/(4+1) = 1/5 => 1/5 = **20% (Correct answer)**

NOTE: To find by how much % is B **more** than A, **decrease the denominator** of the fraction by the value in the numerator

Use this smart method to solve more such questions:

Question 1: If Arjun's salary is 20% more than that of Bheem, then how much percent is Bheem's salary less than that of Arjun?

1) 16.66% 2) 20% 3) 40% 4) 10% 5) None of these

Question 2: The sale of Company N is 40% less than that of Company T. Then by what per cent is the sale of company T more than that of N?

1) 66.66% 2) 25% 3) 20% 4) 33.33% 5) None of these

TECHNIQUE # 3: ASSUMED AVERAGE

Challenge: Find the average of 34, 29, 42, 35, 22, 30

1) 25 2)30 3)33 4) 28 5) None of these

Regular Method	Smart Method
Average = (34+29+42+35+22+30)/6 => Average = 192/6 => Average = 32 Takes about 10-15 seconds to arrive at the correct answer.	Given Values: 34, 29, 42, 35, 22, 30 Let us assume the average to be 30 (since all the values are around 30) Deviations of the given values from the assumed average, i.e, 30 are as follows: +4, -1, +12, +5, -8, 0 Average (deviations) = (+4-1+12+5-8+0)/6 = +2 => Average = 30+2 = 32 This method will help you arrive at the answer in about 5 seconds due to simplicity of the calculations.

Use this smart method to solve more such questions:

Question 1: Find the average of 69, 73, 55, 71, 54, 59

1) 73.5 2) 69.5 3) 65 **4) 63.5** 5) None of these

Question 2: What is the average of 144, 153, 149, 135, 140

1) 139 **2) 144.2** 3) 135 4) 141.6 5) None of these

TECHNIQUE # 4: AVERAGE WHEN A PERSON IS INCLUDED /EXCLUDED INTO/FROM THE GROUP

Challenge: The average age of 39 students and a teacher of a Class are 11 years. If the age of teacher is excluded the average age of class is reduced by 1. What is the age of teacher?

1) 49 years 2) 39 years 3) 50 years 4) 52 years 5) None of these

Regular Method	Smart Method
Average (39 students + Teacher) = 11 => Sum of ages of 39 students and the teacher = 11*40 = 440 ----(1) If teacher is excluded, average age of remaining 39 students = 11-1 = 10 => Sum of ages of 39 students = 10*39 = 390 ----(2) Teacher's age = (1) – (2) => Teacher's age = 440 – 390 = 50	When the teacher leaves the group, (s)he carries the age of 11 years and also takes 1 year from each of the 39 students (as the average is decreased by 1 after the teacher leaves the group) => Teacher's age = 11+39*1 = 50

Use this smart method to solve more such questions:

Question 1: The average age of 50 students and a teacher of a Class are 12 years. If the age of teacher is excluded the average age of class is reduced by 1. What is the age of teacher?

1) 62 years 2) 60 years 3) 61 years 4) 53 years 5) None of these

Question 2: The average age of 30 students is 9 years. If the age of their teacher is included, it becomes 10 years. The age of the teacher is

1) 28 years 2) 30 years **3) 40 years** 4) 43 years 5) None of these

TECHNIQUE # 5: PROFIT AND LOSS COMPARISON PROBLEM USING PROPORTIONALITY

Challenge: Sameer sold an article Rs 460 and earned a profit of 15%. At what price should it have been sold so as to earn a profit of 20%?

1) Rs 465 2) Rs 480 3) Rs 498 4) Rs 485 5) None of these

Regular Method	Smart Method
Initial Selling price of the article = Rs 460 Initial Profit = 15% => Cost Price = 100*460/(100+15) => Cost Price = 100*460/115 = 400 Desired Profit = 20% Required selling price = (100+20)*400/100 => Required selling price = 120*400/100 => Required selling price = 480	Initial profit = 15% Initial selling price = 115%= 460 Desired Profit = 20% Required selling price = 120% =? Upon cross multiplication, we get Required selling price = 120*460/115 = 480

Use this smart method to solve more such questions:

Question 1: Arjun sold an article Rs 1200 and earned a profit of 25%. At what price should it have been sold so as to earn a profit of 30%?

1) Rs 1356 2) Rs 1428 **3) Rs 1248** 4) Rs 1225 5) None of these

Question 2: Smita sold an article Rs 230 and earned a profit of 15%. At what price should it have been sold so as to earn a profit of 20%?

1) Rs 240 2) Rs 244 3) Rs 200 4) Rs 220 5) None of these

TECHNIQUE # 6: PROBLEMS ON TRAINS USING PROPORTIONALITY

Challenge: A train of length 120 m long crosses a pole in 3 seconds. How long will it take to cross a railway platform of length 240 m?

1) 4.5 seconds 2) 3.5 seconds 3) 5 seconds 4) 9 seconds 5) None of these

Regular Method	Smart Method
Speed of the train = Length of the train/ Time take to cross the pole => Speed of the train = 120/3 = 40 m/s Time take to cross a platform = (Length of the train + Length of the platform)/Speed of the train => Time taken to cross the platform = (120+240)/40 = 360/40 => Time taken to cross the platform = 9 seconds	Time taken by the train to cover a distance of 120 m = 3 seconds (crossing of pole) Time taken by the train to cover a distance of 360 m (120m + 240m) = ? => ? = 360*3/120 = 9 seconds (Since time required is proportional to the distance covered)

Use this smart method to solve more such questions:

Question 1: A train of length 80 m long crosses a pole in 4 seconds. How long will it take to cross a railway platform of length 120 m?

2) 12 seconds **2) 10 seconds** 3) 15 seconds 4) 9 seconds 5) None of these

Question 2: A train of length 100 m long crosses a pole in 10 seconds. How long will it take to cross a railway platform of length 64 m?

3) 14.5 seconds **2) 16.4 seconds** 3) 15 seconds 4) 9.2 seconds 5) None of these

TECHNIQUE # 7: EFFICIENCY BASED PROBLEM FROM TIME AND WORK

Challenge: Sejal alone can complete a task in 12 days. She works alone for 4 days. She completes the remaining work in 4 days with the help of her colleague. How many days will the colleague alone take to complete the task?

1) 9 2)12 3)10 4) Cannot be determined 5) None of these

Regular Method	Smart Method
Let the capacity of Sejal and her colleague be S and C respectively. Work equation formed is as follows: W = S*12 = S*4 + (S+C)*4 => 12S = 4S+ 4S+4C => 12S = 8S+4C => 4S = 4C => S = C => The capacity of Sejal (S) and her colleague (C) is equal. Therefore, the number of days required by her colleague alone will be equal to the number of days required by Sejal = 12	As seen in the question, Sejal works alone for 4 days and works with her colleague for another 4 days. So Sejal has worked for a total of 8 days. Therefore, she will be able to complete 8/12 = 2/3 of the total work in those 8 days (as she can complete the total work in 12 days). Hence, the remaining 1/3 of the work was done by her colleague who has worked only for 4 days in the process. So her colleague can complete 1/3 in 4 days, which means she can complete the total work in 4*3 = 12 days

Use this smart method to solve more such questions:

Question 1: Ram alone can complete a task in 15 days. He works alone for 5 days. He completes the remaining work in 6 days with the help of his colleague. How many days will the colleague alone take to complete the task?

1) 22.5 2)12 3)16 4) Cannot be determined 5) None of these

Question 2: Nitin alone can complete a task in 20 days. He works alone for 5 days. He completes the remaining work in 5 days with the help of his colleague. How many days will the colleague alone take to complete the task?

1) 12 **2)10** 3)15 4) 20 5) None of these

TECHNIQUE # 8: PERCENTAGE CHANGE IN AREA OF A QUADRILATERAL

Challenge: The length of a rectangle increased by 40% and its breadth increased by 20%. What will be the percentage increase in the area of the rectangle?

1) 50% 2)10% 3) 44% 4) 68% 5) None of these

Regular Method	Smart Method
Let the original length and breadth of the rectangle be l and b respectively. Area of the rectangle, A = l*b = lb New length, l' = l+40% of l = 1.4l New breadth, b' = b+20% of b = 1.2b Area of the new rectangle, A' = 1.4l*1.2b => A' = 1.68lb Percentage change in the area of the rectangle = [(A' – A)/A]*100 = [(1.68lb – lb)/lb]*100 = 0.68*100 = 68%	Percentage change in area of the rectangle can be measured using the effective percentage formula = a+b+ab/100. Here, a = 40 and b = 20 => Percentage change in area of the rectangle = 40+20+40*20/100 = 68%

Use this smart method to solve more such questions:

Question 1: The length of a rectangle increased by 20% and its breadth increased by 10%. What will be the percentage increase in the area of the rectangle?

1) 23% 2)25% **3) 32%** 4) 30% 5) None of these

Question 2: The length of a rectangle increased by 50% and its breadth decreased by 20%. What will be the percentage increase in the area of the rectangle?

1) 10% **2)20%** 3) 30% 4) 40% 5) None of these

Technique # 9: Multiplication with 5

Challenge: 436*5 = ? 1) 2560 2)2180 3)2340 4) 2460 5) None of these

Regular Method	Smart Method
The traditional multiplication method involves paperwork and takes about 8-10 seconds to get the required answer.	Multiplication with 5 can be done much faster without any paper work by taking 5 as 10/2. All you need to do is take half of the given number and multiply the result by 10 (which is a no brainer) => 436*5 = 436*(10/2) => = (436/2)*10 = 2180

Use this smart method to solve more such questions:

Question 1: 234*5 = ?

1) 1140 2)1440 **3)1170** 4) 1770 5) None of these

Question 2: 6317*5 = ?

1) 21535 2)38855 3) 22145 4) 45685 **5) 31585**

TECHNIQUE # 10: MULTIPLICATION OF COMPLEMENTARY NUMBERS

Challenge: 43*47 = ?

1) 2021 2) 2521 3)1621 4) 2421 5) None of these

Regular Method	Smart Method
The traditional multiplication method involves paperwork and takes about 10-12 seconds to get the required answer.	43 and 47 are complementary numbers as the units places (3 and 7) add to 10 and the tens places is same (4 in both no's). Such numbers can be multiplied in two simple steps: Step 1: Multiply the units places = 3*7 = 21 Step 2: Multiply the tens place with the next integer = 4*5 = 20 Therefore, 43*47 = 2021

Use this smart method to solve more such questions:

Question 1: 24*26 = ?

1) 724 2) 684 **3) 624** 4) 1024 5) None of these

Question 2: 77*73 = ?

1) 3721 2) 5241 3) 5681 **4) 5621** 5) None of these

TECHNIQUE # 11: SQUARE ROOT OF THE GIVEN PERFECT SQUARE

Challenge: What is the square root of 3721?

1) 67 2) 61 3) 37 4) 51 5) None of these

Regular Method	Smart Method
The square root of a given number can be obtained using the Long Division method is obviously long, as the name says, and hence time consuming. Depending on the given perfect square, it may take anywhere between 15 seconds to 30 seconds to get the required answer.	Square root of a perfect square can be obtained in 3 simple steps in about 3-5 seconds as follows: Step 1: Units place of the given number (3721) is 1. Hence the square root ends in 1 or 9. Step 2: Leave the last two digits of the given number (3721). The remaining part is 37 and the highest perfect square less than 37 is 36 = 6^2. Hence the tens place of the final answer will be 6. So the two possible answers are 61 and 69. Step 3: Both the possible answers (61 and 69) fall between 60 and 70. Square of 60 = 3600 and square of 7 = 4900 The given number 3721 is closer to 3600 when compared to 4900. Hence the answer has to be closer to 60. So the correct answer is 61 (closer to 60 when compared to the number 69)

Use this smart method to solve more such questions:

Question 1: What is the square root of 1849?

1) 43 2) 67 3) 33 4) 57 5) None of these

Question 2: What is the square root of 3249?

1) 67 2) 73 **3) 57** 4) 67 5) None of these

TECHNIQUE # 12: SQUARES OF NUMBERS FROM 26 TO 75

Challenge: What is the square of 63?

1) 3609 2)3969 3) 3729 4) 3909 5) None of these

Regular Method	Smart Method
Regular method of finding the square of 63 involves paper work where we multiply 63 with 63 and get the answer as 3969 in about 10 seconds.	The smart method involves using the (a+/-b)^2 expansion with a = 50 and memorizing squares up to 25 (a +/- b)^2 = a^2 +/- 2ab + b^2 n^2 = (50+/-x)^2 = 50^2 +/- 2*50*x + x^2 => n^2 = 2500+/-100*x+x^2 (63)^2 = (50+13)^2 = 2500+100*13+13^2 = 2500+1300+169 = 3969

Use this smart method to solve more such questions:

Question 1: What is the square of 47?

1) 2209 2) 3039 3) 3729 4) 2309 5) None of these

Question 2: What is the square of 39?

1) 1321 2) 1627 **3) 1521** 4) 1781 5) None of these

TECHNIQUE # 13: SQUARES OF NUMBERS FROM 76 TO 125

Challenge: What is the square of 89?

1) 7921 2)6481 3) 8181 4) 7981 5) None of these

Regular Method	Smart Method
Regular method of finding the square of 89 involves paper work where we multiply 89 with 89 and get the answer as 7921 in about 10 seconds.	The smart method involves using the (a+/-b)^2 expansion with a = 100 and memorizing squares up to 25 (a +/- b)^2 = a^2 +/- 2ab + b^2 n^2 = (100+/-x)^2 = 100^2 +/- 2*100*x + x^2 => n^2 = 10000+/-200*x+x^2 (89)^2 = (100-11)^2 = 1000-200*11+11^2 = 10000-2200+121 = 7921

Use this smart method to solve more such questions:

Question 1: What is the square of 93?

1) 7979 **2) 8649** 3) 6729 4) 9129 5) None of these

Question 2: What is the square of 113?

1) 13459 2) 10129 3) 14539 **4) 12769** 5) None of these

TECHNIQUE # 14: VERIFICATION BASED ON RATIONS FOR SOLVING AGE RELATED PROBLEMS

Challenge: Ages of Ajay and Vijay are in the ratio of 2:3 respectively. Six years hence, the ratio of their ages will become 11:15 respectively. What will be Ajay's present age?
1)15 years 2) 24 years 3)16 years 4)35 years 5) None of these

Regular Method	Smart Method
Let the ages of Ajay and Vijay be A and V respectively. A:V = 2:3 => A= 2x and V = 3x; (A+6)/(V+6) = 11/15 => (2x+6)/(3x+6) = 11/15 => 15(2x+6) = 11(3x+6) => 30x+90 = 33x+66 => 3x = 24 => x = 8 => Ajay's present age = 2x = 2*8 = 16	A:V = 2:3 => Ajay's present age must be a multiple of 2. Upon verification, option (1) and option (4) are ruled out as these are not the multiples of 2 (A+6)/(V+6) = 11/15 => Ajay's age after 6 years must be a multiple of 11. According to option (2), A = 24 => Age after 6 years = 24+6 = 30, which is not a multiple of 11. Hence, option (2) is ruled out. From option (3), A = 16 => A+6 = 16+6 = 22, which is a multiple of 11. Therefore, option (3) is the correct answer.

Use this smart method to solve more such questions:

Question 1: Ages of Arun and Deepak are in the ratio of 2:1 respectively. 3 years hence, the ratio of their ages will become 5:3 respectively. What will be Arun's present age?
1)15 years **2) 12 years** 3) 20 years 4) 30 years 5) None of these

Question 2: Present ages of Sameer and Anand are in the ratio of 5:4 respectively. Three years hence, the ratio of their ages will become 11:9 respectively. What is Anand's present age in years?
1) 24 years 2) 27 years 3) 30 years 4) 40 years 5) None of these

TECHNIQUE # 15: MULTIPLICATION USING A SIMPLE ALGEBRAIC IDENTITY

Challenge: 73*87 = ?

1) 6421 2) 6351 3) 6251 4) 4921 5) None of these

Regular Method	Smart Method
The traditional multiplication method involves paper work and takes about 10-12 seconds to get the required answer.	Upon observation, we find that 73*87 can be expressed as (80-7)*(80+7) We know, (a+b)*(a-b) = a^2 – b^2 => (80-7)*(80+7) = 80^2 – 7^2 = 6400-49 = 6351 As seen above, we can do such complex multiplications in about 4 seconds using a simple Algebraic formula.

Use this smart method to solve more such questions:

Question 1: 44*56 = ?

1) 2724 2) 2684 **3) 2464** 4) 1024 5) None of these

Question 2: 82*98 = ?

1) 8036 2) 7456 3) 4686 4) 6646 5) None of these

TECHNIQUE # 16: PROBLEMS BASED ON CONSECUTIVE NUMBERS

Challenge: The sum of 5 consecutive odd numbers is 575. What will be the sum of the next set of 5 consecutive odd numbers?

1) 625 2) 580 3) 600 4) 650 5) None of these

Regular Method	Smart Method
Let the 5 odd consecutive numbers be x, x+2, x+4, x+6, x+8 => x+x+2+x+4+x+6+x+8 = 575 => 5x+20 = 575 => x = 111 So the 5 numbers are 111, 113, 115, 117 and 119 Therefore, the next 5 consecutive numbers are 121, 123, 125, 127 and 129 Required answer = 121+123+125+127+129 = 625	Let a, b, c, d, e, f, g, h, i and j be the ten consecutive odd numbers of which a to e belong to the first set and f to j belong to the second set. f = a+10 (since the difference between each pair of consecutive numbers is 2). Similarly, g = b+10, h = c+10, i = d+10 and j = e+10 => f+g+h+i+j = a+b+c+d+e+50 => Required answer = 575+50 = 625

Use this smart method to solve more such questions:

Question 1: The sum of 3 consecutive odd numbers is 256. What will be the sum of the next set of 3 consecutive odd numbers?

1) 274 2) 280 3) 300 4) 350 5) None of these

Question 2: The sum of five consecutive even numbers is 600. What is the sum of the next set of the consecutive even numbers?

1) 400 **2) 650** 3) 600 4) 550 5) None of these

TECHNIQUE # 17: SUBSTITUTION METHOD IN TRIGONOMETRY

Challenge: The value of $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$ is equal to

1) -1 2) 1 **3) 2** 4) 0 5) -2

Regular Method	Smart Method
Use Trigonometric Identities along with Algebraic Identities: a^3 + b^3 = (a + b)(a^2 − ab + b^2) a^3 – b^3 = (a − b)(a^2 + ab + b^2) ⇨ $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$ $= \left(\frac{(\cos\theta+\sin\theta)(\cos^2\theta-\cos\theta\sin\theta+\sin^2\theta)}{\cos\theta+\sin\theta}\right)+\left(\frac{(\cos\theta-\sin\theta)(\cos^2\theta+\cos\theta\sin\theta+\sin^2\theta)}{\cos\theta-\sin\theta}\right)$ ⇨ $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$ $= (\cos^2\theta-\cos\theta\sin\theta+\sin^2\theta)+(\cos^2\theta+\cos\theta\sin\theta+\sin^2\theta)$ ⇨ $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}=$ $2(\cos^2\theta+\sin^2\theta) = 2$ (since $\cos^2\theta+\sin^2\theta = 1$)	Let's substitute some random value for θ so that we can solve the equation directly with numerical values instead of dealing with trigonometric and algebraic identities. Please note that the given question is independent of the value of θ Let's say, θ = 0 ⇨ $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$ = (1+0)/(1+0) + (1-0)/(1-0) = 1+1 = 2

Use this Smart method to solve more questions:

Question 1: The value of $\frac{1}{(1+\tan^2\theta)}+\frac{1}{(1+\cot^2\theta)}$ is

1) 1/4 **2) 1** 3) 2 4) 1/2 5) None of these

Question 2: The value of $\frac{1}{\text{cosec}\,\theta-\cot\theta}$ - $\frac{1}{\sin\theta}$ is

1) 1 **2) cot θ** 3) cosec θ 4) tan θ 5) None of these

TECHNIQUE # 18: CUBE ROOT OF THE GIVEN PERFECT CUBE

Challenge: What is the cube root of 328509?

1) 63 2) 61 **3) 69** 4) 79 5) None of these

Regular Method	Smart Method
Finding out the cube root of a given number using the conventional method may take about 2-3 minutes.	Cube root of a perfect cube can be obtained in 2 simple steps in about 3 seconds as follows: Step 1: Units place of the given number (328509) is 9. Hence the cube root ends in 9. Step 2: Leave the last three digits of the given number (328509). The remaining part is 328 and the highest perfect cube less than 328 is 216 = 6^3. Hence the tens place of the final answer will be 6. So the answer is 69.

Use this smart method to solve more such questions:

Question 1: What is the cube root of 373248?

1) 73 **2) 72** 3) 78 4) 79 5) None of these

Question 2: What is the cube root of 79507?

1) 43 2) 41 3) 53 4) 47 5) None of these

TECHNIQUE # 19: UNITS PLACE METHOD IN SIMPLIFICATIONS

Challenge: (?)^2 + (65)^2 = (160)^2 - (90)^2 - 7191

1)75 2)77 3) 79 4) 81 **5) None of these**

Regular Method	Smart Method
?^2 + 65^2 = 160^2 - 90^2 – 7191 65^2 = 4225 160^2 = 25600 90^2 = 8100 => ?^2 + 65^2 = 160^2 - 90^2 – 7191 => ?^2 + 4225 = 25600 - 8100 – 7191 => ?^2 = 25600 - 8100 – 7191 - 4225 => ?^2 = 6084 => ? = Square root of 6084 => ? = 78	=> ?^2 + 65^2 = 160^2 - 90^2 – 7191 Units place of 65^2 = 5 Units place of 160^2 = 0 Units place of 90^2 = 0 Considering only the Unit's places, we get => ?^2 + __5 = __0 - __0 - ___1 => ?^2 = __0 - __0 - ___1 - ___5 => ?^2 = _____4 => ? = Square of a number that ends in 4 => ? = ____2 or ____8 Hence the answer is option 5, None of these

Use this smart method to solve more such questions:

Question 1: ?^2 + 79^2 = 172^2 – 88^2 - 8203

1) 93 2) 89 3)83 4)81 **5) None of these**

Question 2: Square root of 3249 + 75^2 + Square root of ? = 5745

1) 3721 2) 4096 3) 3481 **4) 3969** 5) 3364

TECHNIQUE # 20: RATIOS AND PROPORTION

Challenge: A sum of money is divided among A, B, C and D ratio 3:5:8:9 respectively. If the share of D is 1872 more than the share of A, then what is the total amount of money of B & C together?

1) 4156 2) 4165 3) 4056 4) 4065 5) None of these

Regular Method	Smart Method
Let the total amount be T A's share = (3/25)*T B's share = (5/25)*T C's share = (8/25)*T D's share = (9/25)*T => D = A+1872 => (9/25)*T = (3/25)*T + 1872 => (6/25)*T = 1872 => T = 1872*25/6 = 7800 B+C = (5/25)*T + (8/25)*T = (13/25)*T => B+C = (13/25)*7800 = 4056	A's share = 3 parts B's share = 5 parts C's share = 8 parts D's share = 9 parts D - A = 9 parts – 3 parts = 6 parts = 1872 B+C = 5 parts + 8 parts = 13 parts = ? Upon cross multiplication, we get B+C = 13*1872/6 = 4056

Use this smart method to solve more such questions:

Question 1: A sum of money is divided among A, B, C and D in the ratio 5:8:9:11. If the share of B is 2475 more than the share of A, then what is the total amount of money of A & C together?

1) 9900 **2) 11550** 3) 10725 4) 9075 5) None of these

Question 2: A sum of money is divided among P, Q, R and S in the ratio 6:9:8:10. If the share of Q is 2463 more than the share of P, then what is the total amount of money of P & R together?

1) 9963 **2) 11494** 3) 10725 4) 9075 5) None of these

TECHNIQUE # 21: DISTANCE BETWEEN TRAINS BASED ON PROPORTIONALITY

Challenge: Two trains start at the same time from A and B and proceed towards B and A at 36 kmph and 42 kmph respectively. When they meet, it is found that one train has moved 48 km more than the other. What is the distance between A and B?

1) 624 km 2) 636 km 3) 544 km 4) 460 km 5) None of these

Regular Method	Smart Method
Let the distance between A and B be 'd' Let the distance between A and meeting point be x and that between B and meeting point be x+ 48 => x+(x+48) = d Since the two trains start at the same time, the time taken by each train to reach the meeting point is equal. => T1 = T2 => D1/S1 = D2/S2 (since t = d/s) => x/36 = (x+48)/42 => 7x = 6x+288 => x = 288 Required answer, d = x+(x+48) => d = 288+288+48 = 624 km	Distance covered by first train in 1 hour is 36 km and that covered by the second train is 42 km => Difference of distances covered by the two trains in 1 hour = 42 – 36 = 6 km Total difference of distances covered by the two trains at meeting point = 48 km => Time for which the two trains have travelled = 48/6 = 8 hours Distance covered by the two trains together in 1 hour = 36 km+42km=78 km Required answer = 78*8 = 624 km

Use this smart method to solve more such questions:

Question 1: A train leaves station A at the speed of 30 kmph. At the same time, another train departs from station B at the speed of 45 kmph. When they meet, it is found that one train has travelled 60 km more than the other. What is the distance between A and B?

1) 150 km **2) 300 km** 3) 360 km 4) 240 km 5) None of these

Question 2: Two trains start at the same time from A and B and proceed towards B and A at 38 kmph and 46 kmph respectively. When they meet, it is found that one train has moved 64 km more than the other. What is the distance between A and B?

1) 672 km 2) 636 km 3) 544 km 4) 460 km 5) None of these

TECHNIQUE # 22: SUBSTITUTION METHOD IN ALGEBRA

Challenge: If a+b+c=0, then the value of $(\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab})$ is

1) 2 2) 3 3) 4 4) 5 5) None of these

Regular Method	Smart Method
a+b+c = 0 ⇨ a+b = -c ⇨ (a+b)^3 = (-c)^3 ⇨ a^3+b^3+3ab(a+b) = -c^3 ⇨ a^3+b^3+3ab(-c) = -c^3 (since a+b+c = 0, we get a+b = -c) ⇨ a^3+b^3-3abc = -c^3 ⇨ a^3+b^3+c^3 = 3abc ⇨ (a^3+b^3+c^3)/(abc) = 3 ⇨ a^3/(abc) +b^3/(abc) +c^3/(abc) = 3 ⇨ a^2/(bc) +b^2/(ac) +c^2/(ab) = 3 Therefore, $(\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab})$ = 3	Let's substitute values of a, b and c such that a+b+c = 0. For example, let a = 2, b = -1 and c = -1 since, 2-1-1 = 0 Given expression = $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab}$ $= \frac{2^2}{(-1)(-1)} + \frac{(-1)^2}{(-1)(2)} + \frac{(-1)^2}{(-1)(2)}$ = (4/1)+(-1/2) +(-1/2) = 3

Use this smart method to solve more such questions:

Question 1: If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = 3$, then $\frac{2a^2+3c^2+4e^2}{2b^2+3d^2+4f^2}$ = ?

1) 2 2) 3 3) 4 **4) 9** 5) None of these

Question 2: If $x = \frac{4ab}{a+b}$, then the value of $\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b}$ is

1) a 2) b 3) 0 **4) 2** 5) None of these

TECHNIQUE # 23: EFFECTIVE PERCENTAGE IN PROFIT AND LOSS

Challenge: A shopkeeper marks his goods in such a way that even after allowing a discount of 20%, he makes a profit of 12%. How much percent above the cost price is the marked price?

1) 32% 2) 8% 3) 12% 4) 40% 5) None of theses

Regular Method	Smart Method
S = [(100-D)/100]*M, where S is the selling price, D is the discount and M is the marked price. => S = [(100-20)/100]*M = 80M/100 –- (1) S = [(100+P)/100]*C, where S is the selling price, P is the profit and C is the cost price. => S = [(100+12)/100]*C = 112C/100 –(2) From (1) and (2), we get 80M/100 = 112C/100 => M = 112C/80 = 1.4C = (140/100)C => M = 140% of Cost price Therefore, the marked price is 40% above the cost price	p = d + m + d*m/100, where p is the profit percentage, d is the discount percentage (taken negative) and m is the marked up percentage => 12 = -20+m+(-20*m)/100 => m – m/5 = 12+20 => 4m/5 = 32 => m = 40 Therefore, the marked price is 40% above the cost price

Use this smart method to solve more such questions:

Question 1: A shopkeeper marks his goods in such a way that after allowing a discount of 10%, he gains 17%. How much percent above C.P. is the marked price?

1) 50% **2) 30%** 3) 27% 4) 7% 5) None of these

Question 2: A shopkeeper marks his goods in such a way that after allowing a discount of 20%, he gains 28%. How much percent above C.P. is the marked price?

1) 60% 2) 32% 3) 48% 4) 56% 5) None of these